

## ABSTRACT OF THE DISCLOSURE

The present invention relates to a composite gas separation module and to methods for fabricating a composite gas separation module. The present invention also relates to methods for selectively separating hydrogen gas from a hydrogen gas-  
5 containing gaseous stream. In one embodiment, the composite gas separation module includes a porous metal substrate; an intermediate porous metal layer, wherein the intermediate porous metal layer overlies the porous metal substrate; and a dense hydrogen-selective membrane, wherein the dense hydrogen-selective membrane overlies the intermediate porous metal layer. The intermediate porous metal layer can  
10 include can include palladium and a Group IB metal. For example, the intermediate porous metal layer can contain alternating layers of palladium and a Group IB metal.